



Assessment of the water quality and ecosystem health of the Great Barrier Reef (Australia): Conceptual models

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Abstract:

Run-off containing increased concentrations of sediment, nutrients, and pesticides from land-based anthropogenic activities is a significant influence on water quality and the ecologic conditions of nearshore areas of the Great Barrier Reef World Heritage Area, Australia. The potential and actual impacts of increased pollutant concentrations range from bioaccumulation of contaminants and decreased photosynthetic capacity to major shifts in community structure and health of mangrove, coral reef, and seagrass ecosystems. A detailed conceptual model underpins and illustrates the links between the main anthropogenic pressures or threats (dry-land cattle grazing and intensive sugar cane cropping) and the production of key contaminants or stressors of Great Barrier Reef water quality. The conceptual model also includes longer-term threats to Great Barrier Reef water quality and ecosystem health, such as global climate change, that will potentially confound direct model interrelationships. The model recognises that system-specific attributes, such as monsoonal wind direction, rainfall intensity, and flood plume residence times, will act as system filters to modify the effects of any water-quality system stressor. The model also summarises key ecosystem responses in ecosystem health that can be monitored through indicators at catchment, riverine, and marine scales. Selected indicators include riverine and marine water quality, inshore coral reef and seagrass status, and biota pollutant burdens. These indicators have been adopted as components of a long-term monitoring program to enable assessment of the effectiveness of change in catchment-management practices in improving Great Barrier Reef (and adjacent catchment) water quality under the Queensland and Australian Governments' Reef Water Quality Protection Plan.

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Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change;
 surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Policymaker



Climate Change and Human Health Literature Portal

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Extreme Weather Event, Food/Water Quality, Meteorological Factors, Precipitation

Extreme Weather Event: Flooding

Food/Water Quality: Chemical

Geographic Feature:

resource focuses on specific type of geography

Freshwater, Ocean/Coastal

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type:

format or standard characteristic of resource

Research Article, Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content